

CLAIMS

What is claimed is:

1. A multilayer crosslinked polyethylene ("PEX") pipe comprising:
 - 5 (a) an inner tubular core of high density polyethylene ("HDPE") having a maximum wall thickness from about 28 to 100 times smaller than the nominal diameter of pipe in the range from 7 mm (0.25") to 152 mm (6"), ratio 28 being attributable to small diameter non-SDR-9 piping, and ratio 100 being attributable to the larger diameter SDR-9 pipe, wherein the HDPE has a density in the range from 0.941 g/cc to 0.963 g/cc; and,
 - 10 (b) an outer tubular sheath of at least one layer of at least partially crosslinked polyethylene contiguous with the outer surface of the inner core layer.
2. The multilayer pipe of claim 1 wherein the HDPE has a density in the
15 range from about 0.950 to about 0.963 g/cm³ and the PEX is crosslinked to a gel level of at least 65%.
3. The multilayer pipe of claim 2 wherein the inner core has a wall
20 thickness in the range from at least 0.025 mm (1 mil) to about 1.52 mm (0.06") thick for pipe having a nominal diameter in the range from 7 mm (0.25") to 152 mm (6").
4. The multilayer pipe of claim 3 wherein the inner core has a wall
thickness in the range from about 0.05 mm (2 mil) to 0.1 mm (4 mils) for pipe having a
nominal diameter in the range from 13 mm (0.5") to 25 mm (1") and the gel level is
25 greater than 70%.
5. The multilayer pipe of claim 2 wherein the outer sheath of PEX is
crosslinked by a method chosen from the addition of peroxide, electron beam irradiation,
the addition of AZO compounds, and silane grafting process.

6. The multilayer pipe of claim 5 wherein the silane grafting process is selected from the Sioplas process or Monosil process.

7. The multilayer pipe of claim 3 wherein the sheath includes successive
5 inner and outer contiguous layers of PEX melt-bonded to one and another, the outer layer being color-coded.

8. A three layer PEX pipe comprising:

(a) an inner tubular core layer of high density polyethylene (HDPE) having a
10 maximum wall thickness from about 28 to 100 times smaller than the nominal diameter of pipe in the range from 7 mm (0.25") to 152 mm (6"), ratio 28 being attributable to small diameter non-SDR-9 piping, and ratio 100 being attributable to the larger diameter SDR-9 pipe, wherein the HDPE has a density in the range from 0.941 g/cc to 0.963 g/cc;

(b) an intermediate tubular layer of crosslinked polyethylene (PEX) having a
15 gel level of at least 65% contiguously disposed radially outward from the core layer; and,

(c) an outer tubular layer of PEX having a gel level of at least 65%, wherein said outer tubular layer is color-coded for installation in a chosen service.

9. A multilayer pipe comprising:

(a) an inner tubular core layer of high density polyethylene (HDPE) having a
20 maximum wall thickness from about 28 to 100 times smaller than the nominal diameter of pipe in the range from 7 mm (0.25") to 152 mm (6"), ratio 28 being attributable to small diameter non-SDR-9 piping, and ratio 100 being attributable to the larger diameter SDR-9 pipe, wherein the HDPE has a density in the range from 0.941 g/cc to 0.963 g/cc;

(b) an intermediate tubular layer of crosslinked polyethylene (PEX) having a
25 gel level of at least 65%, contiguously disposed radially outward from the core layer;

(c) an oxygen barrier of material other than polyethylene disposed radially outward from said intermediate layer.

10. A process for producing a multilayer pipe comprising co-extruding:
- (a) an inner tubular core layer of high density polyethylene (HDPE) having a maximum wall thickness from about 28 to 100 times smaller than the nominal diameter of pipe in the range from 7 mm (0.25") to 152 mm (6"), ratio 28 being attributable to small diameter non-SDR-9 piping, and ratio 100 being attributable to the larger diameter SDR-9 pipe, wherein the HDPE has a density in the range from 0.941 g/cc to 0.963 g/cc;
- 5 (b) an outer tubular core of at least one layer of crosslinkable polyethylene melt bonded to the outer surface of the inner core layer without the use of adhesive; and,
- (c) crosslinking at least the outer layer to have a gel content of at least 65%.